

[54] SEWING PRESSER FOOT

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112/262

[56] References Cited

UNITED STATES PATENTS

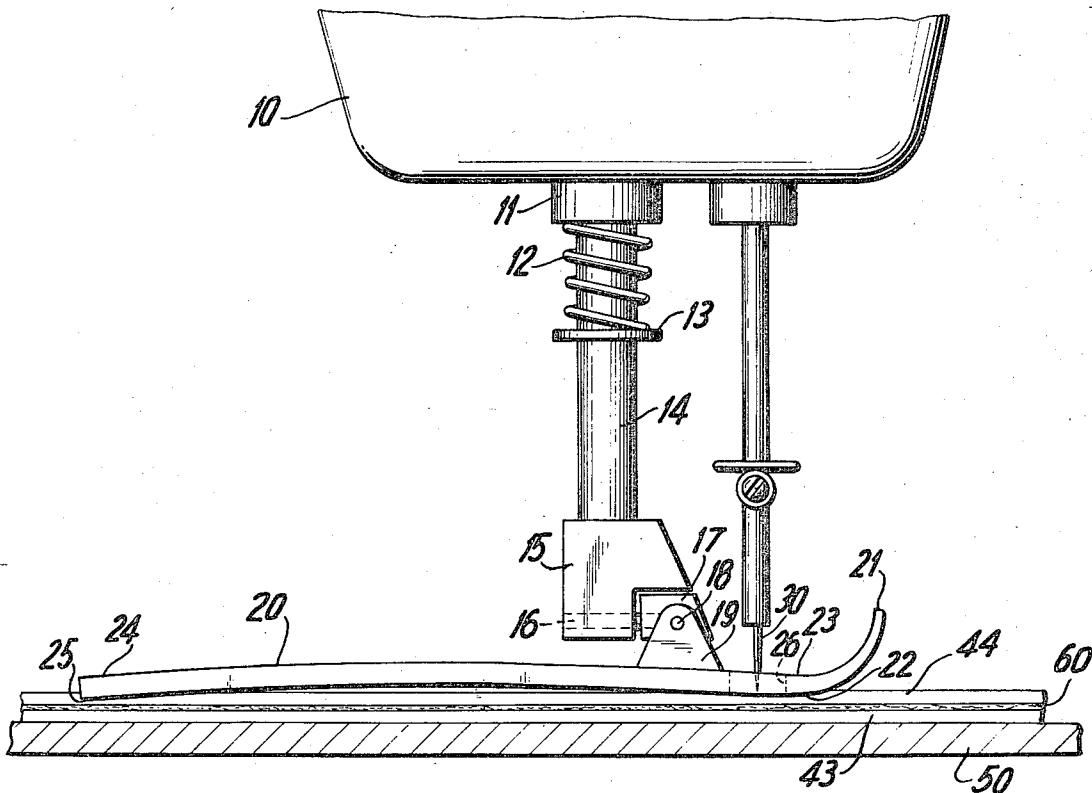
|           |         |               |         |
|-----------|---------|---------------|---------|
| 2,174,290 | 9/1939  | Max .....     | 112/235 |
| 2,241,230 | 5/1941  | Wilmoth ..... | 112/212 |
| 2,694,993 | 11/1954 | Goosman ..... | 112/235 |

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Fisher & Goldstein

[57] ABSTRACT

A presser foot for a sewing machine which eliminates puckering in a fabric being sewn. The foot is slightly concave along its length and has (1) one or more channels on its bottom to guide one or more belts used to convey the fabric, (2) toe and heel portions and a point contact on its bottom at the beginning of the toe portion and a point contact on its bottom at the end of the heel portion and (3) a cut-out portion to allow passage of a sewing needle through the foot.

7 Claims, 4 Drawing Figures





## SEWING PRESSER FOOT

## BACKGROUND

In a common sewing operation a fabric, such as the center pleat in a shirt front, is conveyed between upper and lower belts to a sewing machine where the pleat is sewn. Because of the addition to the fabric of the sewing threads, the pleat will pucker after it is sewn. A way of eliminating puckering in a sewn pleat is to place the pleat under tension and stretch it slightly prior to the sewing operation. However, this is mechanically difficult to do because the pleat is held between upper and lower conveyor belts. Where a plurality of upper and lower belts are used, means for placing the pleat under tension may be inserted between the belts, but this introduces distortion across the pleat.

The apparatus of this invention is a specially designed presser foot for placing a pleat (or other fabric construction) under tension during the sewing operation, and stretching it slightly before the sewing operation, thereby eliminating puckering in the sewn pleat.

## SUMMARY OF THE INVENTION

The apparatus and method of this invention involve means for eliminating pucker in a sewn pleat (or other fabric construction) by placing the pleat in tension and stretching it slightly before the sewing operation. The stretching is caused by the rolls driving the hem belts when there is exerted a downward force on the pleat at a point prior to the sewing needle and at a point after the sewing needle.

In a common sewing operation, upper and lower pairs of hem belts, which may number three, are used to convey a pleat (hem) to be sewn. The belts are slightly resilient and capable of being stretched on the order of two percent of their length. The hem belts are endlessly conveyed around a table by drive rolls located after the sewing operation.

The presser foot of this invention is on the order of two inches wide and four inches long, and preferably is made of hard metal. The presser foot is slightly concave along its length so that at its toe and heel it bears on the hem belts but not at its middle where it is curved upwardly (concave) above the belts after the sewing needles. The foot on its top is attached to means for exerting pressure on the foot and those means are preferably attached at a point closer to the toe than the heel. The foot has a cut-out portion or portions to permit sewing needle or needles to pass through the foot.

The foot preferably has a channel cut along its length for each pair of hem belts. In a preferred form where three upper and lower hem belts are used (see Figures) three channels, equally spaced along the width of the foot, are cut along the length of the bottom of the foot. If the upper and lower hem belts are one-half inch wide and 0.05 of an inch thick the channels are cut slightly larger than one-half of an inch in width and slightly less than 0.05 of an inch in depth, so that a channel closely guides its corresponding upper hem belt and so that the land between each channel does not bear on the pleat.

When the toe of the foot across its width bears on the upper hem belts it tends to brake the forward movement of the pleat. This in combination with the drive rolls distends (on the order of two percent) the hem belts and concomitantly the pleat held between them.

This stretching serves to eliminate pucker in the pleat being sewn.

The heel of the presser foot also bears on the upper hem belts and keeps them bearing on the pleat. In combination with the operation of the drive rolls in pulling the hem belts through the sewing operation and the belts having a slight distendability, the presser foot of this invention in essence grips the pleat in the area of the front of the toe of the foot and at the end of its heel and slightly stretching the hem between those points and before the pleat is sewn. This stretching effectively eliminates pucker in the pleat when and after it is sewn.

## DRAWINGS

In the drawings FIG. 1 is a top view of the presser foot of this invention, and FIG. 2 is a side view of it. FIG. 3 is a side sectional view of the presser foot taken along line 3—3 and FIG. 4 is a front view of it.

## DETAILED DESCRIPTION OF THE INVENTION

The following is a detailed description of a preferred embodiment of this invention. It is made by reference to a center pleat of a shirt front but is not limited to such a fabric construction.

This invention may be used in conjunction with the subject of my copending United States patent application which relates to a plurality of upper and lower hem belts.

In a commercial sewing operation, a center pleat of a shirt front may be carried to a sewing machine for sewing the pleat by a plurality of upper and lower hem belts. Three upper hem belts, 44, 46 and 48, are shown as 44, 46 and 48 in FIG. 1. These operate in conjunction with three corresponding lower hem belts, 43, 45 and 47, FIG. 4, which lie immediately below them. The upper and lower hem belts are one-half of an inch wide and 0.055 of an inch thick. Each belt has a sandwich construction with a nylon fabric core which has a neoprene tape adhered on each side of the core. In normal operation, each belt is capable of being distended to the extent of about two percent of its length when relaxed.

Shirt front pleat 60 is carried to the left between the upper and lower hem belts to a sewing machine 10. The hem belts, such as 42 and 44, are endlessly conveyed about a table 50 by a motor and drive means (not shown), including rolls which drive the hem belts. These are located to the left of the sewing machine 10. The sewing machine 10 includes one or more needles for sewing the pleat. These pass between the conveyor belts when the pleat is sewn. Two such sewing needles on the machine are shown as 30 and 32 in FIG. 1. The presser foot 20 has the special construction shown in FIG. 2. A rod 14 projects downwardly from the sewing machine head 10 and to it is attached a member 15 which is rotatably mounted to member 17 by a pin 16. Member 17 is rotatably attached by pin 18 to a bracket 19 which is attached to presser foot 20. Rod 14 has a fixed collar 13 and bearing on collar 13 is a spring 12 which is urged downwardly by collar rod 11. When a force is applied to collar rod 11 its force is transmitted through the spring 12 to rod 14 and ultimately to presser foot 20. Presser foot 20 has a toe 23 and heel 24. Toe 23 has an upwardly-curved portion 21. The presser foot also has cut-out portions 26 and 27 through which pass the sewing needles 30 and 32. The

needles pass between the conveyor belts when the pleat is sewn. On the bottom of the toe 23 is an area 22 which contacts the hem belts across the width of the foot at the beginning of toe 23. Heel 24 has a similar contact area 25. These extend across the width of the presser foot. The presser foot may rotate around pin 18 and may roll around pin 16 but it is not free to move laterally.

The presser foot, which may be made of metal (which is preferred), plastic or other suitable material, may be of any width desired to accommodate the width of the pleat to be sewn. Its width may be several inches and its length on the order of 4 to 6 inches. As shown in FIG. 2, the presser foot is slightly bowed upwardly from one end to the other (concave along its length) so that the mid-portion of the presser foot does not bear to any extent on the pleat being sewn and permits the pleat to be stretched between points 22 and 25 during the sewing operation.

The presser foot has a channel on its bottom to guide each of the upper hem belts. In the embodiment shown in the drawings, the presser foot has three guide channels, 34, 36 and 38 in FIG. 4, cut lengthwise along its bottom. Each of these is used to guide the upper hem belt on which it rides, and its width is only slightly larger than the width of the belt. Referring to FIGS. 3 and 4 the channel above belt 44 is designated as 34. It is defined by sides 40 and 41 and bottom 42. This channel 34 guides that hem belt 44 at both the toe 23 and heel 24 of foot 20 and the foot has identical channels, 36 and 38 in FIG. 4, cut lengthwise along its bottom, and equally spaced to guide hem belts 46 and 48. Means other than channels may, within the scope of my invention, be used to guide the upper hem belts. For example, the bottom of the presser foot could be flat and have projections at the toe and heel of the foot, positioned along the width of the foot at points corresponding to the outer edges of the upper hem belts, to guide the upper hem belts. I prefer to use channels because of the ease of fabrication of them.

The sewing machine 10 has a throat plate (not shown) which is generally flat but otherwise has the configuration of the presser foot with channels (facing upwardly) to carry and guide lower hem belts 43, 45 and 47.

One preferred form of this invention is a presser foot which is four inches long and two and one-half inches wide. The three upper and lower hem belts are one-half of an inch wide and about 0.055 of an inch thick. The separation between belt 44 and 46 and 46 and 48 is about one-quarter of an inch. Each of the channels, 34, 36 and 38 in FIG. 4, which are cut along the length of the bottom of the foot (see FIG. 4 as to channel 34) is slightly greater than one-half of an inch wide, is about 0.050 of an inch deep (throughout the length of the foot), and the lands (35 and 37 in FIG. 3) separating the channels have a width the same as the distance between the belts 44 and 46 and 46 and 48, about one-quarter of an inch. The presser foot is concave to the extent of being raised at its mid-point about one-sixteenth of an inch above horizontal. This is about the minimum amount necessary so that the bottom of the foot at its middle does not impede the operation of the foot is stretching the pleat during sewing. Because of this, in the middle of the foot channels 34, 36 and 38 do not serve any function, but it is mechanically sim-

pler to form those channels throughout the length of the foot.

In operation the front areas of channels 34, 36 and 38 bear, respectively, on upper hem belts 44, 46 and 48 in the area of contact point 22, and the rear areas of those channels (34, 36 and 38) bear on those upper hem belts in the area of contact point 25. The lands, such as 35 and 37 in FIG. 4, in the bottom of the foot, which are positioned between the belts, do not bear on the pleat. Their only function is to form the channels which operate as stated above.

I have found it preferable to mount the bracket 19 at a distance from the front of the toe so that its distance from contact point 22 is about 20 percent of the distance between contact points 22 and 25.

In prior operations when a pleat, which might be as long as several feet, was sewn, a serious problem encountered was puckering because of the addition of threads to the fabric in the sewing operation. This invention minimizes or eliminates puckering in a pleat being sewn as it easily places the pleat in tension while it is being sewn. The contact points 22 and 25 at each end of the presser foot (in conjunction with the driven upper and lower hem belts such as 44 and 42) place the pleat in tension and stretch it slightly between those points. When a force (which may be varied as desired) is applied to collar rod 11, it is transmitted to the presser foot which presses down on the tops of upper hem belts 44, 46 and 48 at points 22 and 25. This effectively grips the pleat between those points and with the force of the drive rolls pulling the hem belts to the left (FIG. 2) through the sewing operation the belts stretch slightly (on the order of two percent) and the pleat which is gripped between the hem belts is stretched to the same extent.

As stated the bracket 19 is preferably mounted at a point from the beginning of the toe equal to about twenty percent of the length of the foot. This puts greater pressure on the toe of the foot than on its heel.

As previously stated, the presser foot may rotate around pin 18 and may roll around pin 16, but it is not free to move laterally. This freedom of the foot to rotate or roll permits the foot to move to accommodate any variations in thickness along the width or length of the pleat being sewn.

We claim:

1. A presser foot for a sewing machine which has toe and heel portions, which is at least slightly concave along its length, has a contact area on its bottom across its width at the beginning of the toe portion and a contact area on its bottom across its width at the end of the heel portion, has means on its bottom to guide one or more belts used to convey fabric to be sewn and has a cut-out portion in the toe portion to allow passage of a sewing needle through the foot.

2. A presser foot for a sewing machine which is generally rectangular and has toe and heel portions which is slightly concave along its length, has a contact area on its bottom across its width at the beginning of the toe portion and a contact area on its bottom across its width at the end of the heel portion, has one or more channels on its bottom to guide one or more belts used to convey fabric to be sewn and has cut-out portion in the toe portion to allow passage of a sewing needle through the foot.

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3. The presser foot of claim 2 in which the toe portion at its front is curved upwardly away from said contact area.

4. The presser foot of claim 3 comprising also means attached to the foot for exerting force to it while fabric is being sewn.

5. The presser foot of claim 4 wherein the force means is attached at a distance from the beginning of the toe portion equal to about twenty percent of the length of the foot.

6. The method of sewing a pleat in a fabric, comprising:

conveying the pleat between a plurality of upper and lower belts to a sewing machine,

engaging the fabric with a generally rectangular presser foot which has toe and heel portions, is at least slightly concave along its length, has a contact area across its width at the beginning of the toe

6

portion and a contact area across its width at the end of the heel portion, has channels on its bottom to guide said upper belts, has a cut-out portion in the toe portion and has attached means for exerting a force on the foot,

exerting a force on the foot through said means to exert pressure on said upper belts and through them said pleat and thereby to stretch the pleat between the contact areas, and

10 passing a sewing needle through said cut-out portion, between the conveying belts and through said pleat while stretched thereby to sew it without causing it substantially to pucker.

7. The method of claim 6 wherein said force means is attached to the foot at a distance from the beginning of the toe portion equal to about twenty percent of the length of the foot.

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